



UNITED STATES PATENT AND TRADEMARK OFFICE

mn
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,894	04/15/2004	Hua-Jun Zeng	MS1-1890US	8978
22801	7590	07/06/2007		
LEE & HAYES PLLC 421 W RIVERSIDE AVENUE SUITE 500 SPOKANE, WA 99201			EXAMINER LE, JESSICA N	
			ART UNIT 2161	PAPER NUMBER
			NOTIFICATION DATE 07/06/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

lhptoms@leehayes.com

Office Action Summary	Application No.	Applicant(s)	
	10/825,894	ZENG ET AL.	
	Examiner	Art Unit	
	Jessica N. Le	2161	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is responsive to the amendment filed on 06/14/2007.
2. Claims 27 and 41 are amended.
3. **Claims 1-50** are currently pending and presented for examination.

Continued Examination Under 37 CFR 1.114

4. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/14/2007 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-3, 5, 7-12, 15-17, 19, 21-26, 29-31, 33, 35-40, 43-47, & 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowman et al. US Patent Number 6,006,225 (hereinafter Bowman), in view of Adar et al., US Patent Number 7,136,876 (hereinafter Adar).**

Regarding claim 1, Bowman teaches a computer-implemented method for related term suggestion (abstract: “*A search engine is disclosed which suggests related terms*”; and Col. 4, lines 41-42: “*methods for suggesting related terms*”), the method comprising:

responsive to receiving a term/phrase (Fig. 7, element 710 – *receiving each term in the query*; Col. 1, lines 31-32) from an entity, evaluating the term/phrase in view of terms/phrases in the term clusters to identify one or more related term suggestions (Col. 15, lines 55-59 (or Claim 11); and Col. 4, lines 41-42: “*methods for suggesting related terms*”).

However, Bowman does not explicitly teach generating term clusters as a function of calculated similarity of term vectors, each term vector being generated from search results associated with a set of high frequency of occurrence (FOO) historical queries previously submitted to a search engine.

In the same field of endeavor, Adar teaches generating term clusters as a function of calculated similarity of term vectors (Fig. 1, and Fig. 8, element 814), each term vector being generated from search results associated with a set of high frequency of occurrence (FOO) historical queries previously submitted to a search engine (Fig. 2, element 108 and 116; Fig. 7, element 720; Fig. 8, elements 814-816; Col. 7, lines 12-30; Col. 8, lines 63-66; and Col. 9, lines 1-41).

It would have been obvious to a person having ordinary skill in the art at the time of Applicant's invention to modify the teachings of Bowman and Adar to include generating term clusters as a function of calculated similarity of term vectors, each term vector being generated from search results associated with a set of high frequency of

occurrence (FOO) historical queries previously submitted to a search engine as disclosed by Adar with the motivation to use evaluating the term/phrase in view of terms/phrases in the term clusters to identify one or more related term suggestions as disclosed in Bowman to provide the search based on term suggestion more efficiently.

Claim 2 is rejected for the reasons set forth hereinabove for claim 1 and furthermore Bowman discloses a method wherein a multi-sense query (Fig. 7, element 750 – *multi-term query is illustrated as a multi-sense query*) comprises the term/phrase (Abstract: “*A search engine...suggests related terms...using query term...*”).

Claim 3 is rejected for the reasons set forth hereinabove for claim 1 and furthermore Bowman discloses a method wherein the entity is a computer-program application (Col. 1, lines 37-41; and Col. 5, lines 1-2 – wherein “*server program*” and “*server application*” are illustrated as a computer-program application to be used) and/or an end-user (Col. 4, lines 4-6).

Claim 5 is rejected for the reasons set forth hereinabove for claim 1 and furthermore Bowman discloses a method further comprising:
collecting historic query terms (Col. 2, line 33: “*on historical query submissions to the search engine.*”) from a query log (Col. 2, line 52: “*a query log file*” & lines 56-57: “*the query log*”; and Fig. 1, element 135); and

determining ones of the historic query terms (Col. 2, line 33: “*on historical query submissions to the search engine.*”) with a high FOO (Fig. 4, element 420 and Fig. 7, element 770).

Claim 7 is rejected for the reasons set forth hereinabove for claim 1 and furthermore Adar discloses a method wherein evaluating further comprises:

- identifying a match between the term/phrase and term(s)/phrase(s) from one or more term clusters (Fig. 7, element 714); and
- responsive to identifying, generating related term suggestion(s) comprising the term(s)/phrase(s) (Fig. 7, elements 718-720; and Col. 7, lines 12-25).

Claim 8 is rejected for the reasons set forth hereinabove for claim 1 and claim 7 and furthermore Bowman discloses a method wherein the related term suggestion(s) (Col. 4, lines 41-42: *"methods for suggesting related terms"*) further comprise for each term/phrase of the term(s)/phrase(s) (Abstract: *"A search engine...suggests related terms...using query term..."*), a frequency of occurrence value (Fig. 4, element 420 and Fig. 7, element 770) indicating a number of times the term/phrase occurs (Col. 10, lines 28-19: *"the number of times the related term occurred in combination with the key term."*) in a set of mined historical queries (Col. 2, line 33: *"on historical query submissions to the search engine."*).

Claim 9 is rejected for the reasons set forth hereinabove for claim 1 and furthermore Adar discloses:

- sending respective ones of the high FOO historical queries to the search engine to obtain the search results (Fig. 1, element 108; Fig. 7, elements 716-720).
- extracting features from at least a subset of search results corresponding to the respective ones (Fig. 1; and & Fig. 8).

producing term vectors from the features as a function of term and inverted document frequencies (Col. 7, lines 12-30; Col. 8, lines 63-66; and Col. 9, lines 1-41).

Claim 10 is rejected for the reasons set forth hereinabove for claims 1 & 9 and furthermore Bowman discloses the features (Fig. 2) comprise a title, description, and/or context (Fig. 2; Col. 2, lines 60-61; and Col. 5, lines 15-22) for the respective ones of the high FOO (Fig. 4, element 420 and Fig. 7, element 770) historical query terms (Col. 2, line 33: “*on historical query submissions to the search engine.*”).

Claim 11 is rejected for the reasons set forth hereinabove for claims 1 & 9 and furthermore Bowman discloses the respective ones comprise top ranked ones of the search results (Fig. 8A & 8B; and Fig. 9).

Claim 12 is rejected for the reasons set forth hereinabove for claim 1 and furthermore Bowman discloses the term clusters (Abstract: “...*The related terms are generated using query term...in the same query.*”; and Col. 3, lines 6-7: “*generate a set of related terms for refining a submitted query*”) are a first set of term clusters (Col. 3, lines 6-7: “*generate a set of related terms for refining a submitted query*” wherein a first set of term cluster to be generated and used through this processing), and wherein the method further comprises:

determining that there is no match between the term/phrase and the terms/phrases (Fig. 7); and
responsive to the determining:

evaluating the term/phrase in view of terms/phrases of the second set of term clusters to identify one or more related term suggestions (Col. 15, lines 55-59 (or Claim 11); and Col. 4, lines 41-42: “*methods for suggesting related terms*”).

However, Bowman does not explicitly teach making a second set of term clusters from calculated similarity of term vectors (Fig. 1, and Fig. 8, element 814), each term vector being generated from search results associated with a set of low FOO historical queries previously submitted to the search engine.

In the same field of endeavor, Adar teaches making a second set of term clusters from calculated similarity of term vectors, each term vector being generated from search results associated with a set of low FOO historical queries previously submitted to the search engine (Fig. 2, element 108 and 116; Fig. 7, element 720; Fig. 8, elements 814-816; Col. 7, lines 12-30; Col. 8, lines 63-66; and Col. 9, lines 1-41).

Claims 15-17, 19, and 21-26 recite “*a tangible computer-readable data storage medium*”, **claims 29-31, 33, and 35-40** recite “*a computing device*”, and **claims 43-49** recite “*a computing device*” for performing a method similar to claims 1-3, 5, & 7-12, and therefore these claims are rejected by the same reasons.

6. Claims 6, 13-14, 20, 27-28, 34, 41-42, & 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowman in view of Adar, further in view of Bennett US PG Publication No. 2004/0117189 (hereinafter Bennett).

Claim 6 is rejected for the reasons set forth hereinabove for claim 1.

Art Unit: 2161

However, the combination of Bowman and Adar does not explicitly teach before creating the term clusters: reducing dimensionality of the term vectors; and normalizing the term vectors.

In the same field of endeavor, Bennett discloses a method further comprising before creating the term clusters:

reducing dimensionality of the term vectors (Paragraph [0361]: “a term vector” and Paragraph [0386]: “*which allows all logically possible (even linguistically impossible) word sequences and which reduces the task perplexity via probabilistic modeling of the N-gram sequences*”); and

normalizing the term vectors (Paragraphs [0361]-[0366]).

It would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made to modify the teachings of Bowman, Adar, and Bennett to include reducing dimensionality of the term vectors and normalizing the term vectors as disclosed by Bennett with the motivation to use generating term clusters as disclosed in Bowman to allow providing searching term suggestion for multi-sense query more efficiently.

Claim 13 is rejected for the reasons set forth hereinabove for claim 1 and claim 12 and furthermore Bowman discloses:

identifying the low FOO historical queries (Fig. 7, elements 750, 760 and 770 – wherein exists a low FOO historical queries to be used when there is a match between a multi-term query and all related terms lists/phrase(s)) from historical queries (Col. 2, line 33: “*on historical query submissions to the search engine.*”) mined from a query log (Col. 9, lines 8-9: “within the *query log 135*”);

sending respective ones (Col. 3, line 1) of at least a subset of the low FOO (Fig. 7, elements 750, 760 and 770 – wherein exists a low FOO historical queries to be used when there is a match between a multi-term query and all related terms lists/phrase(s)) historical queries to the search engine (Col. 2, line 33: “*on historical query submissions to the search engine.*”) to obtain search results (Fig. 9; and Col. 9, line 5: “*from a search results page*”);

extracting features from at least a subset of search results (Fig. 8A & 8B; and Fig. 9; and Col. 9, lines 41-43)

However, the combination of Bowman and Adar does not explicitly teach producing the term vectors from the features as a function of term and inverted term frequencies.

In the same field of endeavor, Bennett discloses producing the term vectors from the features as a function of term (Paragraphs [0361]-[0366]) and inverted document frequencies (Paragraph [0369]).

It would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made to modify the teachings of Bowman, Adar, and Bennett to include producing term vectors from the features as a function of term and inverted term frequencies as disclosed by Bennett to identifying the low FOO historical queries as disclosed in Bowman to allow providing searching term suggestion for multi-sense query more narrow down results.

Claim 14 is rejected for the reasons set forth hereinabove for claim 1 and claim 13 and furthermore Bowman discloses a method further comprising after clustering:

determining that there is no match between the term/phrase and term(s)/phrase(s) from the first set of term clusters, the first set being based on high FOO historical queries (Claim 15; Fig. 7, elements 750,760, 770); and

responsive to the determining, identifying a match (Col. 1, lines 31-41) between the term/phrase and term(s)/phrase(s) from one or more of the second set of term clusters, the second set being based on low FOO historical queries (Fig. 7, elements 750, 760 and 770 – wherein exists a low FOO historical queries to be used when there is a match between a multi-term query and all related terms lists/phrase(s)); and

responsive to identifying (Col. 1, lines 31-41), generating related term suggestion(s) (Col. 3, lines 6-7: “*generate a set of related terms for refining a submitted query*”) comprising the term(s)/phrase(s) (Abstract: “*A search engine...suggests related terms.....using query term...*”; and Col. 12, lines 27-34).

Claims 20, & 27-28 recite “*a tangible computer-readable data storage medium*”, **claims 34, & 41-42** recite “*a computing device*”, and **claim 50** recite “a computing device” (means for) for performing a method similar to claims 6, & 13-14, and therefore these claims are rejected by the same reasons.

7. Claims 4, 18, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowman in view of Adar, further in view of Bennett, and further in view of Vaithyanathan et al., US Patent Number 5,819,258 (hereinafter Vaithyanathan).

Art Unit: 2161

Claim 4 is rejected for the reasons set forth hereinabove for claim 1.

However, the combination of Bowman and Adar does not explicitly teach determining the calculated similarity as follows:

$$\text{sim}(q_j, q_k) = \sum_{i=1}^d w_{ji} \cdot w_{ki};$$

wherein d represents vector dimension, q represents a query, k is a dimension index, and wherein weight w for the i^{th} vector's j^{th} term is calculated as follows:

$$w_{ji} = TF_{ji} \times \log(N / DF_j); \text{ and}$$

wherein TF_{ji} represents term frequency, N is a total number of query terms, and DF_j is a number of extracted feature records that contain term j .

In the same field of endeavor, Bennett teaches the calculated similarity as follows:

$$\text{sim}(q_j, q_k) = \sum_{i=1}^d w_{ji} \cdot w_{ki};$$

wherein TF_{ji} represents term frequency, N is a total number of query terms, dimension index (Bennett, Paragraphs [0366]-[0369]).

However, the combination of Bowman, Adar, and Bennett does not teach

$$w_{ji} = TF_{ji} \times \log(N / DF_j); \text{ and}$$

wherein TF_{ji} represents term frequency, N is a total number of query terms, and DF_j is a number of extracted feature records that contain term j .

In the same field of endeavor, Vaithyanathan teaches

$$w_{ji} = TF_{ji} \times \log(N / DF_j); \text{ and}$$

wherein TF_{ji} represents term frequency, N is a total number of query terms, and DF_j is a number of extracted feature records that contain term j .

(see, Col. 8, lines 1-36).

It would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made to modify the teachings of Bowman, Adar, Bennett, and Vaithyanathan to include the calculated similarity of term vectors as disclosed by Vaithyanathan and Bennett with the motivation to use evaluate the term/phrase in view of terms/phrases in the term clusters to identify one or more related term suggestions as disclosed in Bowman and Adar to allow providing searching term suggestion for multi-sense query more accrual and efficiently.

Claim 18 recites "*a tangible computer-readable data storage medium*" and **claim 32** recites "*a computing device*", for performing a method similar to claim 8, and therefore these claims are rejected by the same reasons.

Response to Arguments

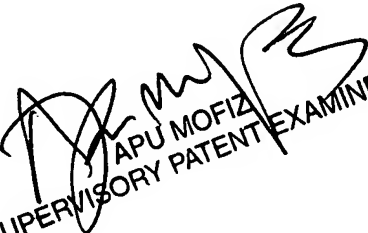
8. Applicant's arguments filed on 06/14/2007 with respect to **claims 1-50** have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica N. Le whose telephone number is (571) 270-1009 and fax number is (571) 270-2009. The examiner can normally be reached on M-F 6:30 am - 3:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu M. Mofiz can be reached on (571) 272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JNL
07/07/2007 KBP


APU MOFIZ
SUPERVISORY PATENT EXAMINER